CLAIMS

What is claimed is:

1. A photolithographic apparatus for use in a photolithographic system for projecting light onto a workpiece, said photolithographic apparatus comprising a container containing a transparent fluid, said container having a bottom membrane contacting an upper surface of the workpiece and overlapping at least one side edge of the workpiece such that a fluid filled skirt is formed extending beyond the at least one edge of the workpiece.

2. The photolithographic apparatus of claim 1, wherein the fluid filled skirt is formed at the side edge of the workpiece such that the bottom membrane substantially contacts and conforms to the surface contour of the upper surface and the at least one side edge of the workpiece.

3. The photolithographic apparatus of claim 1, wherein the bottom membrane comprises a flexible, liquid impermeable membrane.

4. The photolithographic apparatus of claim 1, wherein the bottom membrane comprises a transparent material.

5. The photolithographic apparatus of claim 1, wherein the workpiece is a semiconductor wafer.

6. The photolithographic apparatus of claim 5, wherein the upper surface of the semiconductor wafer is coated with a photoresist material.

7. The photolithographic apparatus of claim 1, wherein the bottom membrane provides vertical containment of the optical transmission fluid, said container further including a side wall member coupled to said bottom membrane, said side wall providing horizontal fluid containment.

8. The photolithographic apparatus of claim 7, said side wall member coupling the bottom membrane to a top membrane to form a substantially liquid impermeable container enclosure.

9. The photolithographic apparatus of claim 8, further comprising a final lens element disposed over and in substantial abutment with the top membrane.

10. The photolithographic apparatus of claim 9, wherein said final lens element is a photolithographic lens cover.

11. The photolithographic apparatus of claim 7, wherein said side wall member and bottom membrane form an open fluid container externally accessible from above.

12. The photolithographic apparatus of claim 11, further comprising a lens apparatus disposed over the open fluid container.

13. The photolithographic apparatus of claim 12, wherein said lens apparatus includes a final lens element contacting the fluid within the container.

14. A projection exposure apparatus providing photolithographic processing of a semiconductor workpiece, said projection exposure apparatus comprising a fluid container having a bottom membrane and a side wall member defining an open reservoir containing a transparent fluid, wherein said container is disposed over the semiconductor workpiece such that the bottom membrane lays in contact with at least a portion of the upper surface of the semiconductor workpiece.

15. The projection apparatus of claim 14, wherein the bottom membrane of said container is transparent.

16. The projection apparatus of claim 14, wherein the bottom membrane comprises a flexible material such that the lower outer surface of the open fluid reservoir substantially conforms to the surface contour of the upper surface of the semiconductor workpiece.

17. The projection apparatus of claim 14, wherein the bottom member overlaps at least one side edge of the semiconductor workpiece such that a fluid filled skirt is formed extending beyond the at least one edge of the semiconductor workpiece.

18. The projection apparatus of claim 14, wherein the semiconductor workpiece comprises a semiconductor wafer.

19. A photolithographic system for projecting light onto a workpiece, said photolithographic system comprising:

a fluid container having a transparent bottom membrane and a side wall member defining an open reservoir containing a liquid, wherein said container is disposed over the semiconductor workpiece such that the bottom membrane contacts at least a portion of the upper surface of the semiconductor workpiece; and

a lens assembly disposed over the open reservoir such that a final lens element is at least partially immersed within the liquid.

20. The photolithographic system of claim 19, further comprising liquid circulation means for establishing liquid flow on the bottom surface of the final lens element.